



other solvent (such as ethylene glycol), pH controlling agent, and 0.01-10% thickener which swells in an alkaline medium resulting in an increase in viscosity of the ink.” The Examiner concedes that JP ‘014 does not disclose the claimed thickener, and does not disclose the claimed pigment surface treated with a resin and a surfactant.

However, the Examiner asserts that Shay discloses thickeners comprising carboxyl groups and hydrophobic groups, and thus concludes that it would have been obvious to one of ordinary skill in the art to use such thickeners in the inks of JP ‘014.

In addition, the Examiner asserts that JP ‘732 discloses surface treating pigments with resin, and subsequently mixing the resin treated pigments with a surfactant. The Examiner concludes that pigments treated with both polymer and surfactant, as presently claimed, will result. To support the Examiner’s position that the mixing step will result in pigment particles with both polymer and surfactant, the Examiner additionally cites the ‘261 Patent.

This rejection is respectfully traversed, on the grounds that the present claims, as amended herein, are directed to an ink composition having a viscosity of 100 mPa·s (i.e., 100 cP) or more, which contains a pigment whose particles have a diameter of 500 nm or less, and the diameter of the particles is stable for a 6 month period.

The primary reference, JP ‘014 is completely silent as to the particle size of the pigment contained within the ink composition, and does not teach or suggest the notion that particle size is a factor to be controlled in order to produce a stable ink composition having good print quality.

The secondary references, JP ‘732 and the ‘602 Patent, are also completely silent as to the particle size of the pigment, and are completely silent respecting the viscosity of the resulting ink composition. These secondary references do not provide any motivation for preparing an ink composition having a viscosity of 100mPa·s or more containing pigment particles having a diameter of 500 nm or less.

The '261 Patent secondary reference teaches away from preparing an ink composition having a viscosity of 100 mPa·s or more, disclosing that the viscosity of the ink composition is about 1-10 centipoise (i.e., 1-10 mPa·s), and is preferably less than 3 centipoise (i.e., 3 mPa·s ) (see col. 12, lines 37-40 of the '261 Patent). 1 cP is the same as 1 mPa·s. Therefore the '261 Patent teaches away from including surface treated pigment particles as described therein in an ink composition having a viscosity of 100 mPa·s or more, as presently claimed.

Accordingly, one of ordinary skill in the art would not have been motivated to prepare an ink composition having a viscosity of 100 mPa·s or more, containing pigment particles having a diameter of 500 nm or less.

Applicants have surprisingly found that ink compositions of the presently claimed invention exhibit superior properties compared to conventional ink compositions. As can be seen from the data set forth in Tables 1 and 2 of the specification (pages 21-22), the ink compositions of the present invention (Examples 1-8) exhibit better ink seeping resistance and enhanced writing properties, when compared to Comparative Examples 1-4 set forth in Table 3 on page 23.

Applicants have also surprisingly found that ink compositions of the presently claimed invention are stable over six months at room temperature. As applicants disclose on page 24 of the specification, the pigment particles do not change over an extended period of time. Because the pigment particles do not coagulate and grow larger, ink composition stability is maintained thereby preventing settling.

The thickening system of the presently claimed composition provides both steric hindrance resistance and associative adsorption, resulting in an ink composition of high viscosity. The associative thickening action of the thickener is affected by the state of the pigment, since the pigment particles form a network-like aggregate with the thickener. See page 14, lines 3-9, of the specification. The unique combination of thickening actions results in enhanced properties of the composition, including greater pigment stability over time, without coagulation or precipitation of the pigment.

For these reasons, JP '014 and '732 and the '602 and '261 Patents, alone, or in combination, fail to render obvious claims 1-2 and 5-9. Accordingly, applicants respectfully request that the rejection be withdrawn.

In view of the above amendments and remarks, applicants believe that none of the claims are obvious over the prior art, and that each of the presently pending claims in this application is in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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